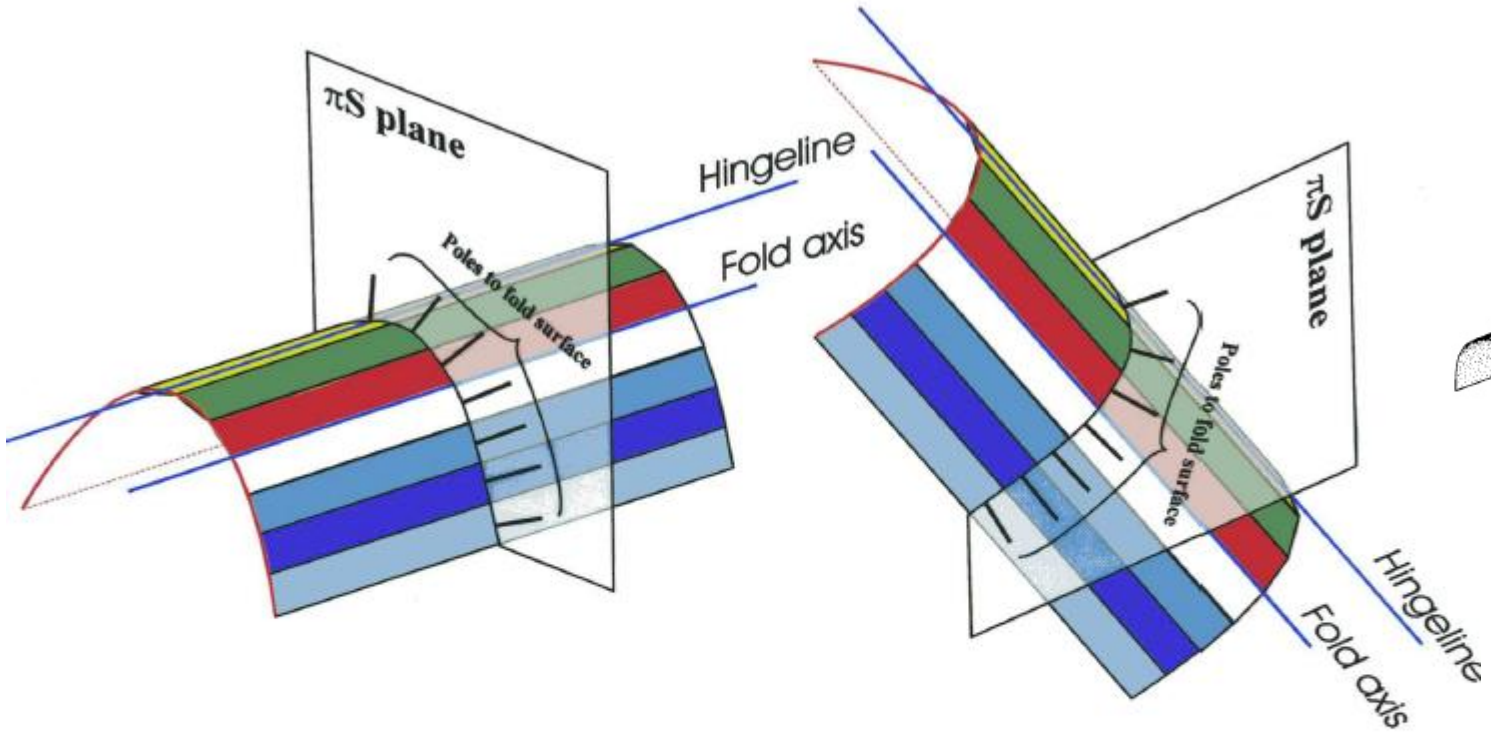
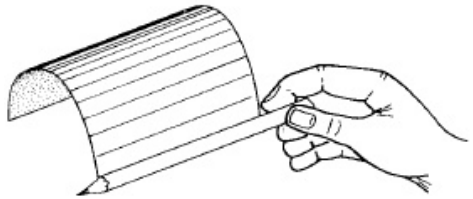
Lab 5 Geometrical analysis of folds II

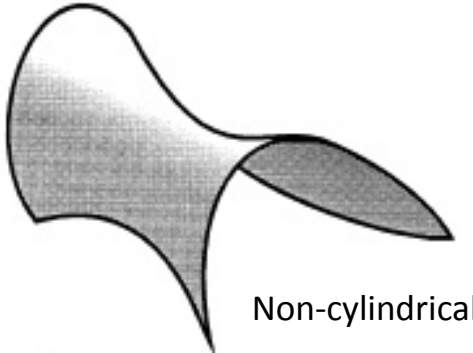
Fold classification: cylindrical fold and Non-cylindrical fold





cylindrical fold

For a cylindrical fold, the poles to the fold surface lie in a common plane (πS) perpendicular to the fold hingeline.

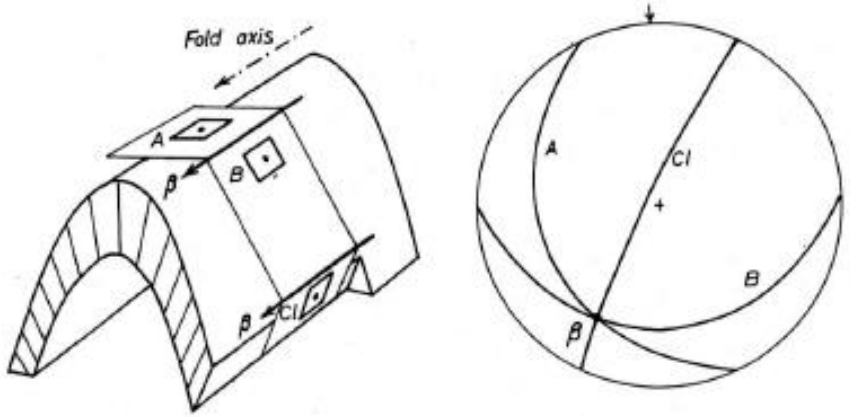


Non-cylindrical fold

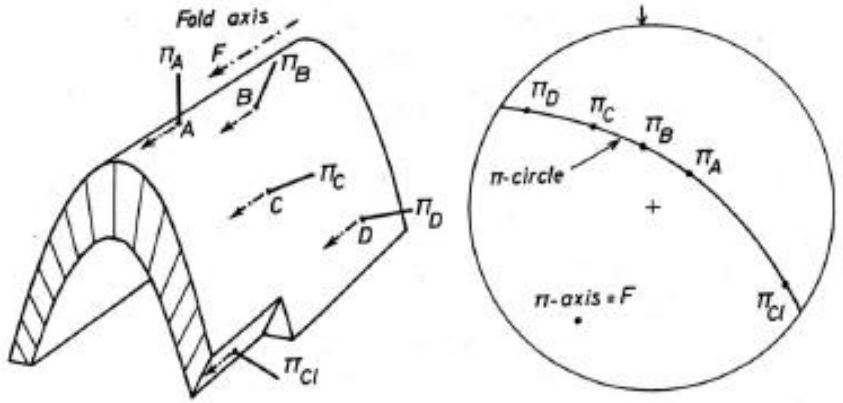
β and π diagrams

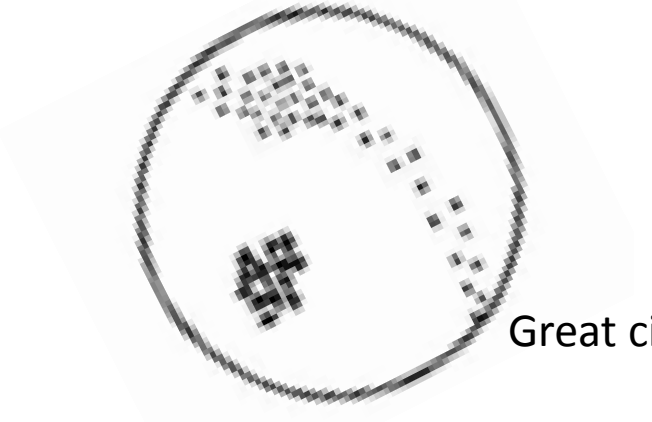
For a perfect cylindrical fold:

Fold surface dips plotted as great circles intersect at a single point, which is the hinge line plot (β -diagram).



Fold surface dips plotted as plane poles lie in a great circle, the pole to which is the hinge line plot (π-diagram).

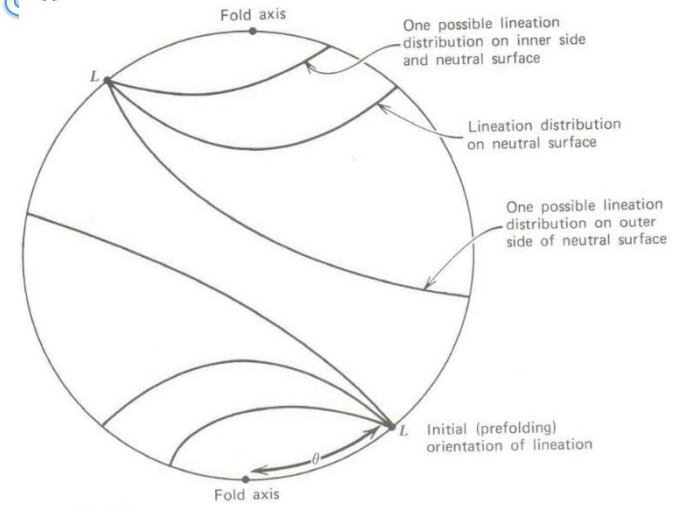


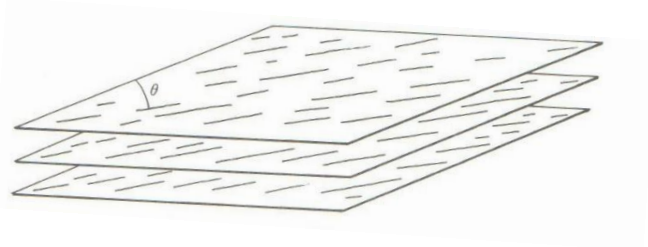


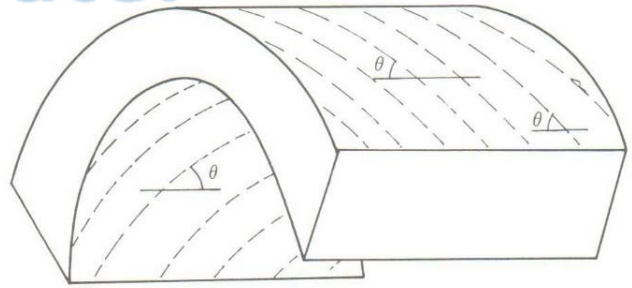
Great circle girdle

Linear structures were reoriented in later folding

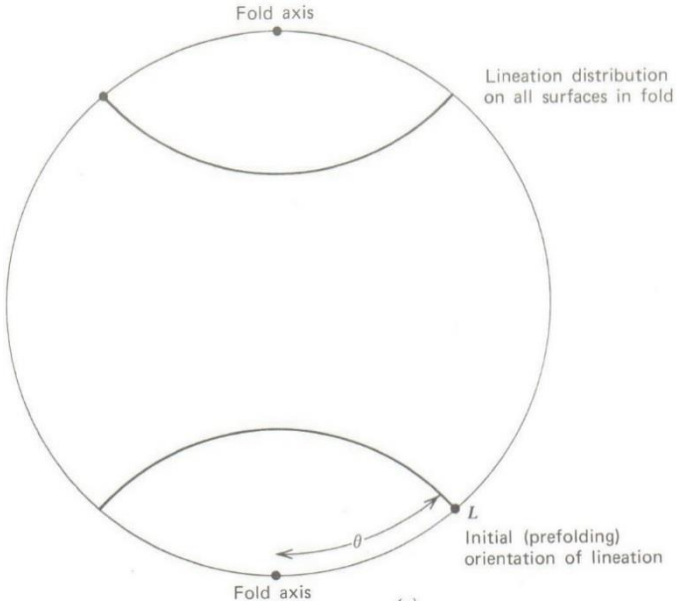
Orthogonal flexure



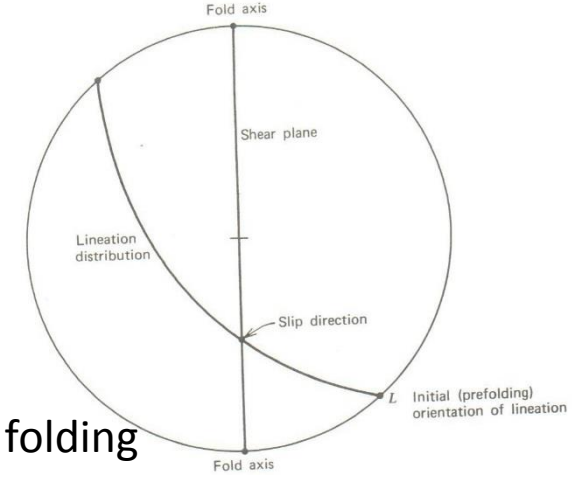




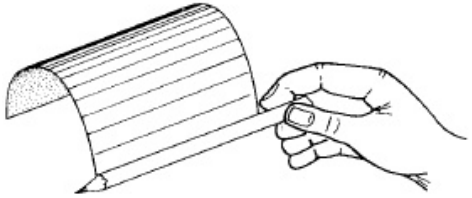
Flexural flow



Initial orientation is on the circle



Passive-shear folding



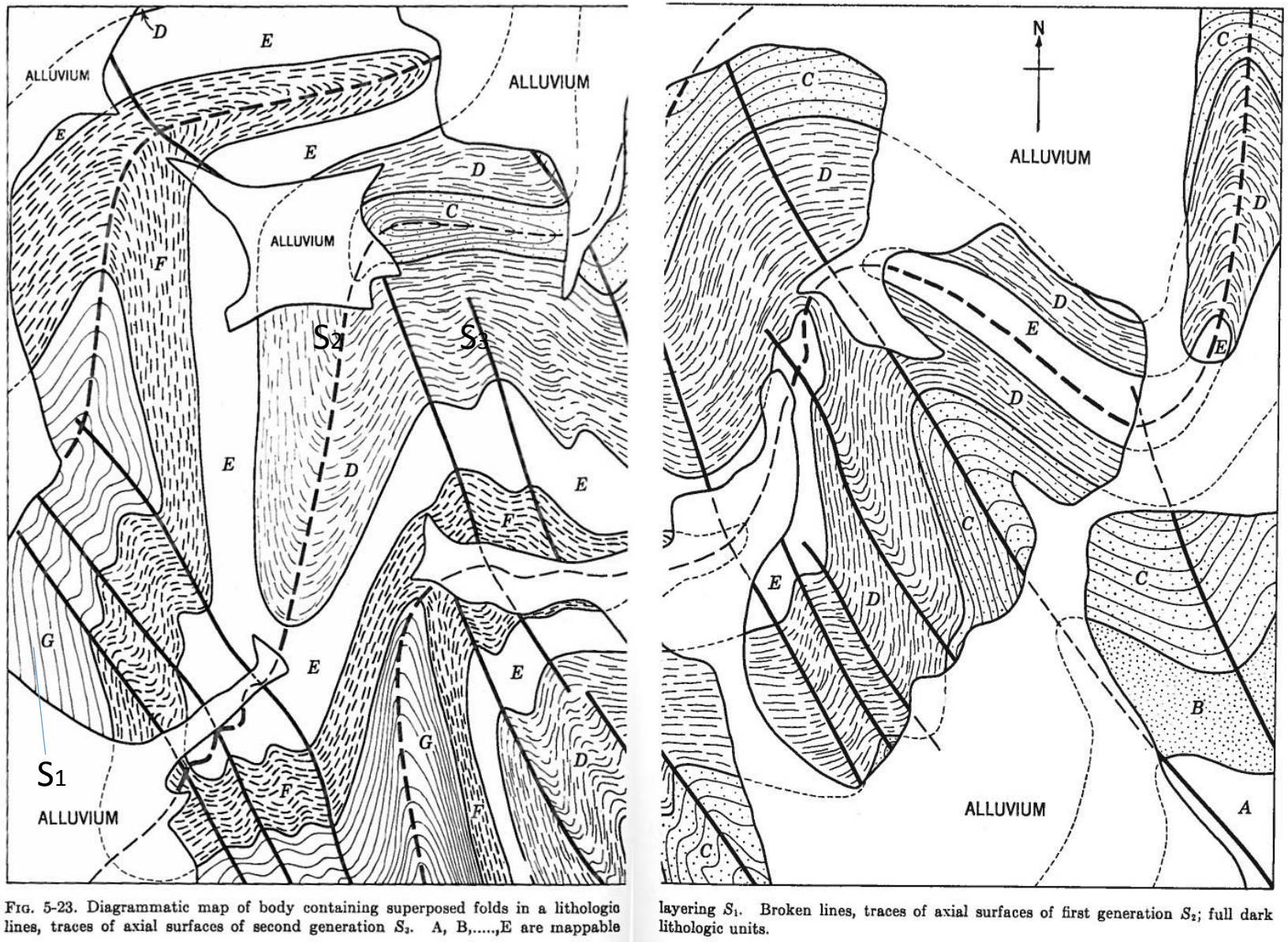
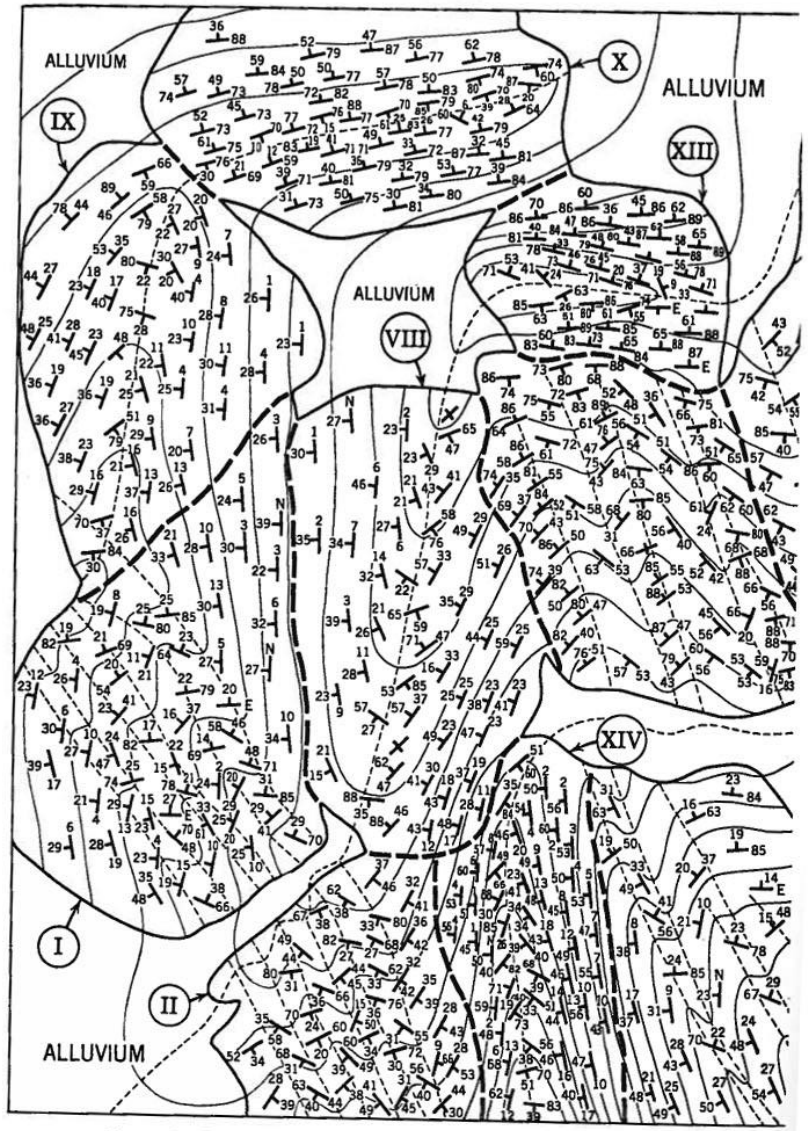


FIG. 5-23. Diagrammatic map of body containing superposed folds in a lithologic lines, traces of axial surfaces of second generation S_3. A, B,.....,E are mappable layering S_1. Broken lines, traces of axial surfaces of first generation S_2; full dark lithologic units.

From textbook Turner and Weiss, 1963. Structural analysis of Metamorphic Tectonites. Page 176



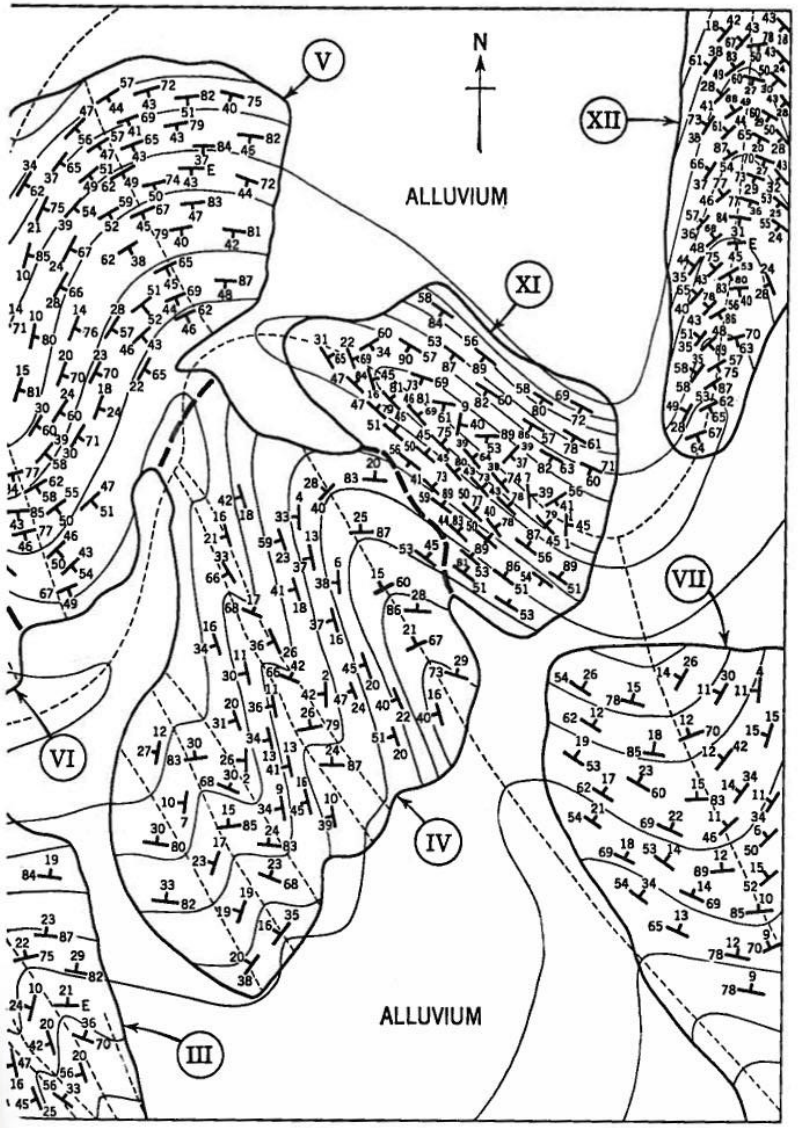
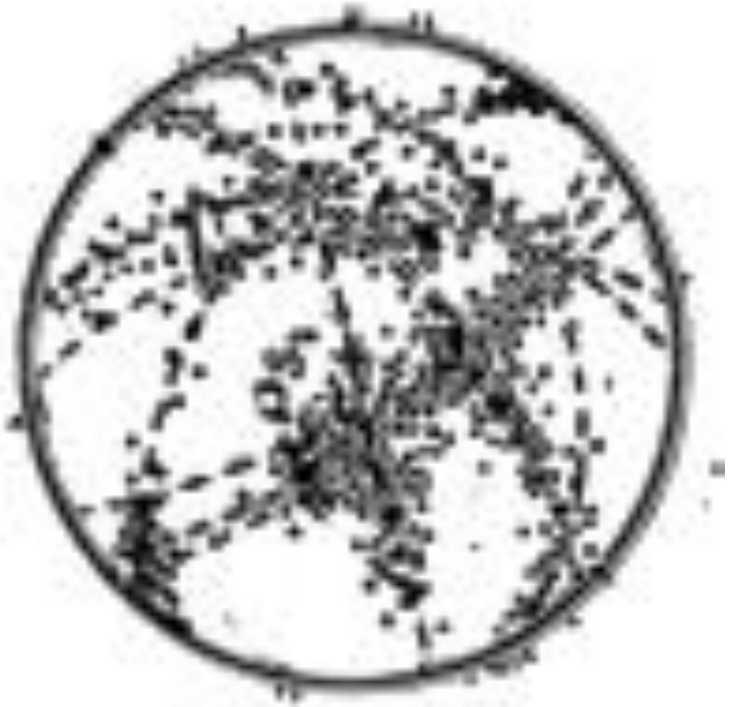


FIG. 5-24. Domains of plane cylindrical folding of S_1 with S_2 as axial plane (I to VII) and with S_2 as axial plane (VIII to XIV) (from Fig. 5-23).



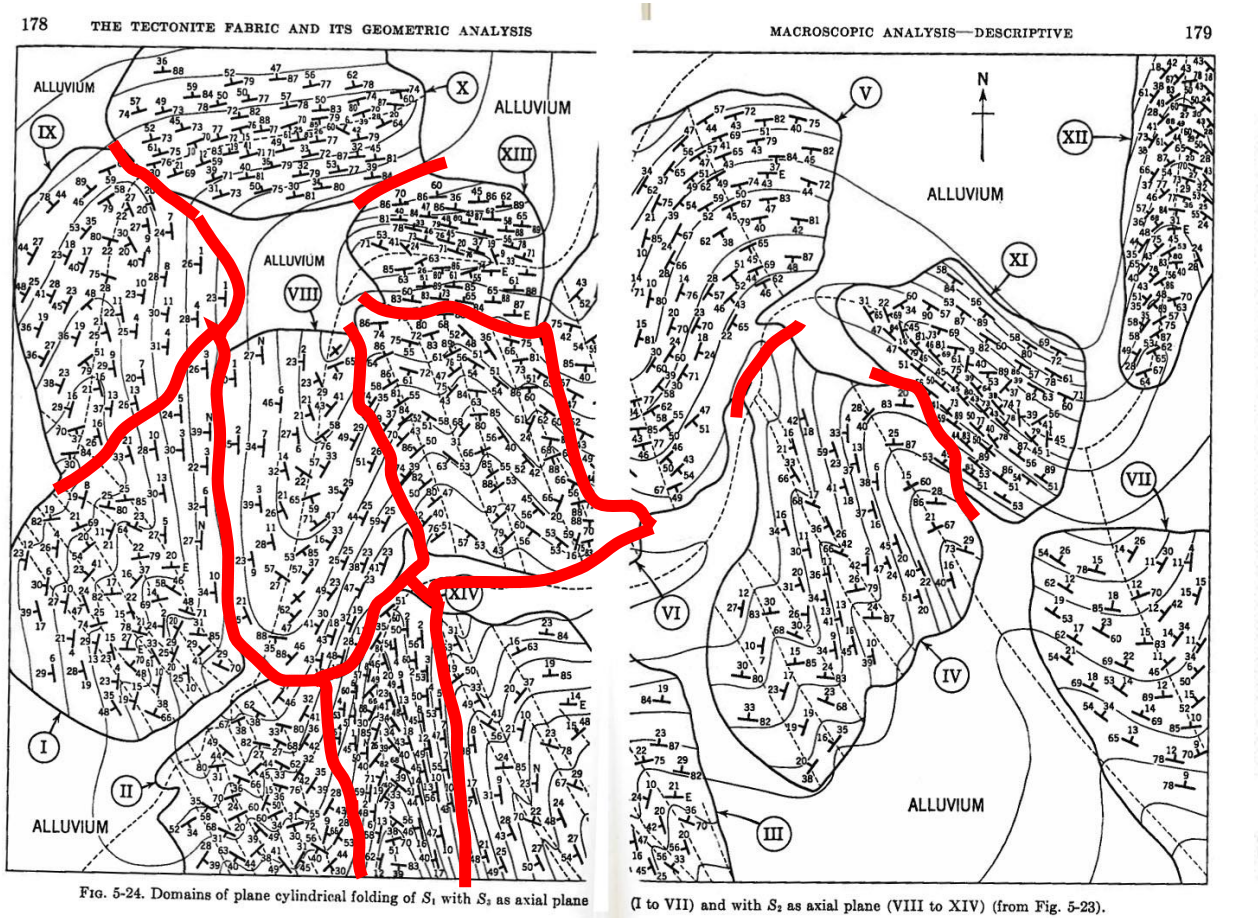
Plot all data together; complicated and hard to understand; does not help

Divide into small areas (homogenous domains)

Homogenous Domain: Structural data from the domain (area) show simple pattern that we can understand

Data analysis

- Equal-area projection: powerful tool for data analysis (structural analysis)



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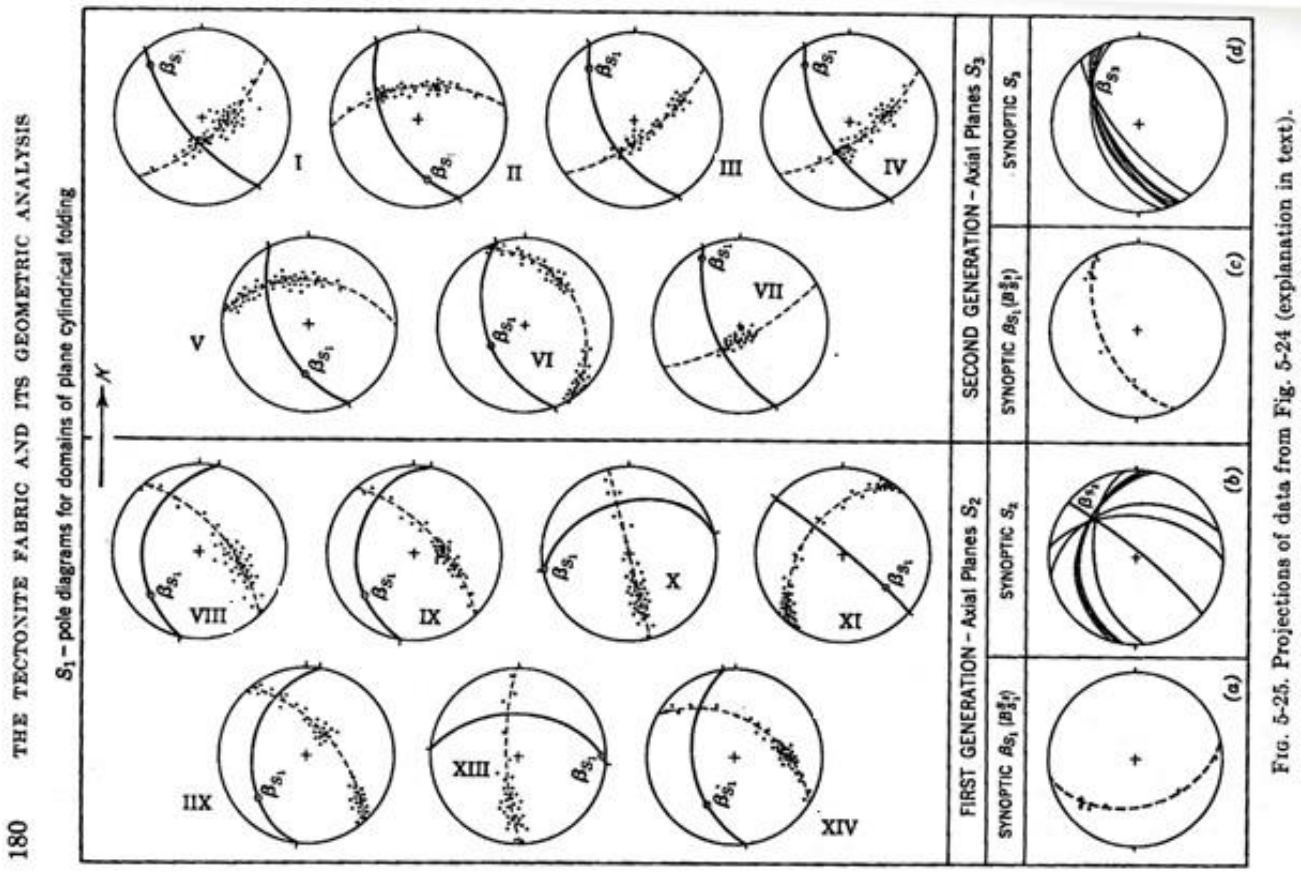


FIG. 5-25. Projections of data from Fig. 5-24 (explanation in text).

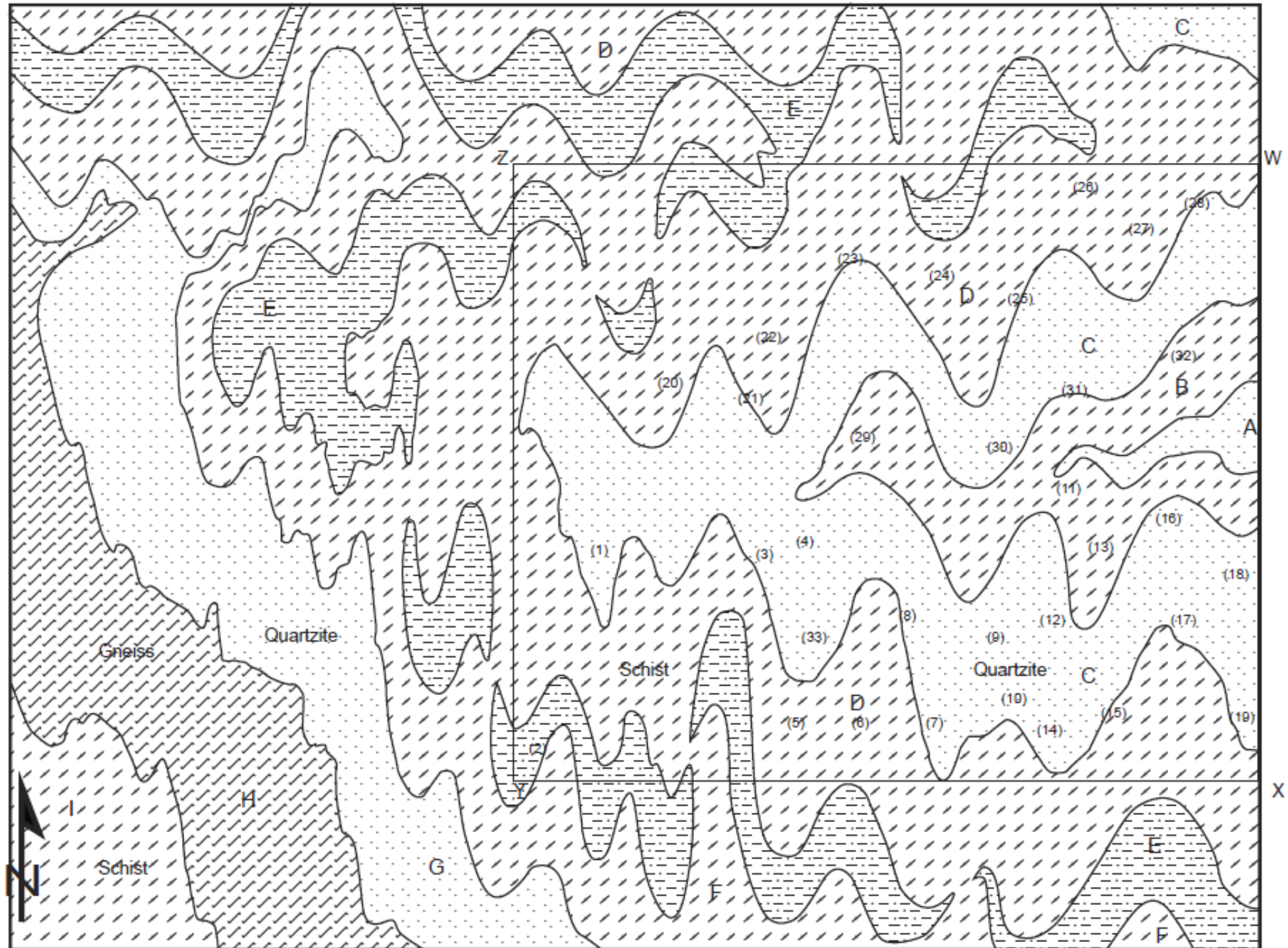
Homogenous Domain: Structural data from the domain (area) show simple pattern that we can understand

Plot orientation data and also consider their positons on map; By trial and error: find domains

Software for stereographic/equal-area projection

- Software Stereonet developed by Rich Allmendinger

http://www.geo.cornell.edu/geology/faculty/RWA/programs/stereonet.html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